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Quarterly Progress Report, Contract No. NAS5-27463  
**Landsat-D Investigations in Snow Hydrology**

Reporting Period: July 1 to September 30, 1983



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**Results to Date**

We have now received three Landsat-4 TM tapes (7 bands) within our study area in the southern Sierra Nevada (path 41, row 35, 10 December 1982; path 42, row 34, 13 January 1983; path 42, row 35, 18 January 1983). During the reporting period we have worked on registration of the TM data to digital topographic data, on comparison of TM, MSS and NOAA meteorological satellite data for snowcover mapping, and on radiative transfer models for atmospheric correction.

We have implemented software to transform digital topographic data to the SOM projection, and therefore register TM data. Currently we are waiting for high-resolution digital elevation model data to arrive from USGS.

We have traveled to Scripps Remote Sensing Facility, and have extracted NOAA meteorological satellite data for 10 dates, 3 of them corresponding to our TM data sets.

We have completed an atmospheric radiative transfer computer program for remote sensing. The code is based on Wiscombe's ATRAD80 program, modified for azimuthal dependence. Currently we are testing it.

We have completed a literature review of texture analysis of remote sensing data. We have selected some methods to try analyzing spatial contiguity of snow within the snowcovered area, based on a two-channel version of the gray level co-occurrence matrix, combined with edge detection based on our algorithm for computing slopes and exposures from digital terrain data.

**Presentations by Principal Investigator**

1. Snow Reflectance from Thematic Mapper, IGARSS meeting, San Francisco, September 1983. (paper will be submitted to *IEEE Transactions on Geoscience and Remote Sensing*)